

# PATENT SPECIFICATION

944,688

DRAWINGS ATTACHED.

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944,688



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## COMPLETE SPECIFICATION.

### A Railway Rail and Fastening Arrangement.

We, LOCKSPIKE LIMITED, a British Company, of 41/43 Mincing Lane, London, E.C.3, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a railway rail and fastening arrangement.

In the Specification of our Patent No. 861,473 (to which this is an addition), there is described and claimed a fastening member for anchoring a railway rail, comprising a length of resilient metal of rod form which is bent so to have, progressing from one end of the length of metal to the other, a first portion which constitutes a substantially straight leg, then a second portion in the form of a reverse bend, then a third portion extending generally in the direction of said one end, then a fourth portion which extends from the third portion, generally to that side thereof upon which said leg is disposed, and constitutes a second reverse-bend, and finally a fifth portion extending in the general direction towards the junction between the first and second portions, the configuration being such that when the fastening member is *in situ* with its first portion horizontal and it is viewed in plan, the third and fifth portions appear on opposite sides of said first portion. A fastening member as just set forth will be referred to below as "a fastening member of the character herein defined".

In the aforementioned Specification, there is also described a railway rail and fastening arrangement comprising, in combination, a flange-footed railway rail, a fixed anchorage member disposed adjacent the

rail, portions of said anchorage member defining a passage which extends alongside the rail, parallel to the length of the rail, and is closed at the top and open at least at one end, a fixed unyielding surface which, as seen from the rail, is disposed outward of said passage, and a fastening member of the character herein defined having the first portion thereof inserted in said one end of the passage and the third and fifth portions bearing one upon the top of the rail flange and the other upon said surface.

The present invention is a modification of that rail and fastening arrangement.

According to the present invention, there is provided a railway rail and fastening arrangement comprising, in combination, a concrete railway sleeper, a flange-footed rail resting on the sleeper, a retaining arrangement which is on one side of the rail beside the flange and does not extend to the other side of the rail and which is fixed to the sleeper after the concrete has set, a fastening member of the character herein defined having the first portion thereof extending substantially parallel to the rail and pressing upwardly on a surface of the retaining arrangement and having the third and fifth portions bearing downwardly one upon the top of the rail flange and the other upon a fixed surface which, as seen from the rail, is disposed beyond said first portion, the retaining arrangement including a portion which projects downwardly into the sleeper and terminates at a point which is lower than the bottom of the first portion of the fastening member by an amount at least equal to the thickness of the rod of which the fastening member is made.

For a better understanding of the inven-

tion, and to show how it may be put into practice, some examples in accordance with the invention are described below with reference to the accompanying drawings, in which:—

Figure 1 is an end view of a rail-and-fastening arrangement, showing parts on both sides of the rail, part of the arrangement being shown as a section taken as indicated by the lines and arrows marked I—I in Figure 4;

Figures 2 to 6 show part of what is shown in the left-hand half of Figure 1, Figure 2 being a plan view, Figure 3 being a side view as seen in the direction of the arrow III in Figure 1 and Figures 4 to 6 being sectional views, the sections being taken as indicated by the lines and arrows marked IV—IV, V—V and VI—VI, respectively, in Figure 1;

Figure 7 is a view, corresponding to Figure 1, of a modification of the fastening arrangement according to Figures 1 to 6, the section being taken as indicated by the lines and arrows marked VII—VII in Figure 8;

Figure 8 is a part-sectional view of the fastening arrangement shown in Figure 7, the section being taken as indicated by the lines and arrows marked VIII—VIII of Figure 7;

Figures 9 to 11 are, respectively, an end view, a plan view and a side view of a third fastening arrangement;

Figure 12 is a plan view of a bent steel bar forming part of another fastening arrangement;

Figure 13 is a plan view of this arrangement and Figures 14 and 15 are an end view and a side view, respectively;

Figures 16 to 18 are an end view, a side view and a plan view, respectively, of a further fastening arrangement; and

Figures 19 and 20 are, respectively, a plan view and a sectional end view, taken as indicated by the lines and arrows XX—XX of Figure 19, of another fastening arrangement.

Similar or corresponding parts in the different figures are similarly numbered.

Referring firstly to Figures 1 to 6, there is shown the flange 1 of a flange-footed railway rail resting on a rubber pad 2 which is laid on the top of a concrete railway sleeper 3. On the two sides of the rail there are two similar arrangements for holding the rail down, although this is shown in detail only in the case of the left-hand side. It includes a clip as described and illustrated in Specification No. 861,473. Only three limbs, 7, 8 and 9, of the clip are shown, in dotted lines. These numbers represent the same parts of the clip as they do in the drawings in Specification No. 861,473. The arrangement also includes a cast iron or

steel retaining member in the form of a block 4 which, after the concrete has set, is inserted in a recess 5 in the sleeper with a cup 6 made of electrically insulating material, such as rubber, which separates the block 4 from the concrete. The block 4 is formed with a passage 11 that extends parallel to the rail and is open at both ends and receives the limb 7 of the clip. This passage is divided into two parts, both of which are closed at the top, by the block 4 being formed with a recess 12 in the base of which is a hole 13, a fixing member in the form of a screw-threaded bolt 14, with a square head 16 and a circular flange 17 is screwed into a tubular hardwood plug 15 that is cast in the concrete, the head 16 of the bolt lying in the recess 12. When the bolt is home, the flange 17 abuts a shoulder in the block 4 and the top of the bolt head is below the position adopted by the limb 7 of the clip.

The limb 9 of the clip bears on the top of the rail flange and the limb 8 bears on a concave surface 18 of the block 4. The side of the block which is nearer the rail prevents excessive sideways movement of the rail.

In the fastening shown in Figures 7 and 8, the flange 17 of the bolt 14 is hexagonal and instead of the bolt having a square head it has a fine screw-thread 20 at the top. The recess 12 in the block 4 is omitted and instead the hole 13 simply opens into the passage 11 and its walls are screw-threaded to suit the top of the bolt. After the bolt 14 has been forced home with a spanner and before the rail is positioned, the block 4 is screwed onto the top of the bolt 14. It can be removed by unscrewing, but only after the clip and the rail have been removed. In the example shown in Figures 1 to 6, the block 4 can be fitted and removed whilst the rail is in position.

The rubber cup 6 in this case is formed with three annular grooves 6A and the gap marked 6B above the cup is filled with a bituminous compound.

In both the fastenings described above, the axis of the bolt 14 and the hole 13 which receives it intersects the passage 11.

In the fastening shown in Figures 9 to 11, epoxy resin or other electrically insulating material 22 is laid in a recess in the sleeper and on it rests a malleable cast iron plate 23 formed with two vertical, elongated holes 24. Two hooks 25 made by bending round steel rod are inserted in these holes and secured in vertical holes. (This is done before the plate 23 is placed in its position 26 in the sleeper, by means of epoxy resin 27.) The lower parts of the hooks are screw-threaded. The curved parts of the hooks remain above the plate 23 and under them is passed the limb 7 of the clip. The

limb 8 bears on a concave surface 18 as before.

Figures 12 to 15 show a fastening arrangement in which the clip is held by a round bar of steel 30 which is first bent so that its ends 31 and 32 come together and it has two straight sides and two bends like a running track. The two straight sides are then bent about a common axis into a U so that the aforementioned two bends, marked 33 and 34 in the drawing, come uppermost. A plate 35 having a horizontal part 36 and an upwardly bent part 37 is laid upon the base of the U and is held down by a bolt 38 having a square head 39. The bolt may be secured in the sleeper in the same way as the hooks 25 of Figures 9 to 11 or in the same way as the bolt 14 of Figures 1 to 6.

Electrically insulating material may be provided at the place marked 40 if desired.

The limb 7 of the clip is passed under the arches formed by the bends 33 and 34 and the limb 8 bears downwardly upon the horizontal part 36 of the plate 35, whereas the part 37 of the plate locates the rail.

In the example shown in Figures 16 to 18, the two or more pieces of metal to hold the clip are replaced by a single casting 42 formed with a passage 11 to receive the limb 7 of the clip, a concave surface 18 on which the limb 8 bears and a shank 43 which projects downwardly into the sleeper, where it is secured with epoxy resin 27.

Figures 19 and 20 show a modification of what is shown in Figures 16 to 18. The casting 42 here has two short lugs 50, projecting into separate holes in the sleeper, instead of one longer shank 43. It also has a projection 51 extending a short distance under the rail.

The examples described above may be modified in various ways. The threaded bolt 14 of Figures 1 and 7 may be inserted in a hole in the sleeper and held by epoxy resin. Instead, the thread on the bolt may be suitable for co-operation with a nut, in which case the bolt will pass through the sleeper to a recess on the underside of the sleeper, where a nut and washer will be fitted. Yet again the head of the bolt could be at the bottom and there could be a nut on the top. In the construction shown in Figures 9 to 11, the two hooks could be long enough to pass through the sleeper to nuts on the underside. Instead, the hooks could be screwed into wooden inserts as described with reference to Figure 1. Yet again, the hooks could be integral with one another, that is to say their lower ends could be joined by a piece of bar material which would then extend horizontally, from left to right in Figure 11. Also, the shank 38 of Figure 14 could be held in the sleeper in any of the ways mentioned

above with regard to the bolt 14. Also, the shank 43 of Figure 16 and the lugs 50 of Figure 20 could be screw-threaded. The projection 51 of Figure 20 could be omitted if desired.

Any screw-threaded parts driven into epoxy resin could be coated with a material that facilitates their being withdrawn subsequently.

Finally, it may also be mentioned that the following parts could be incorporated in the sleeper during casting of the sleeper: 14 in Figure 7, 25 in Figure 9, 38 in Figure 14 (if its upper end is screw-threaded to receive a nut instead of having an enlarged head), 42 in Figures 16 and 20 and the above-described arrangement of two hooks integral with one another.

#### WHAT WE CLAIM IS:—

1. A railway rail and fastening arrangement comprising, in combination, a concrete railway sleeper, a flange-footed rail resting on the sleeper, a retaining arrangement which is on one side of the rail beside the flange and does not extend to the other side of the rail and which is fixed to the sleeper after the concrete has set, a fastening member of the character herein defined having the first portion thereof extending substantially parallel to the rail and pressing upwardly on a surface of the retaining arrangement and having the third and fifth portions bearing downwardly one upon the top of the rail flange and the other upon a fixed surface which, as seen from the rail, is disposed beyond said first portion, the retaining arrangement including a portion which projects downwardly into the sleeper and terminates at a point which is lower than the bottom of the first portion of the fastening member by an amount at least equal to the thickness of the rod of which the fastening member is made.

2. A combination according to Claim 1, wherein the retaining arrangement includes a metal block formed with a horizontal passage for said first portion of the fastening member and a vertical hole through which a bolt passes into the sleeper, the axis of the bolt intersecting said passage.

3. A combination according to Claim 2, wherein the block lies in a recess at the top of the sleeper.

4. A combination according to Claim 2 or 3, wherein the block is formed with a recess which extends downwardly from the top and divides said passages into two parts, the recess extending below said passage and having said vertical hole formed in its floor, the bolt having a polygonal head below said first portion of the fastening member and also having a flange which rests on the floor of the recess.

5. A combination according to Claim 3,

wherein a cup made of electrically insulating material separates the block from the walls of the recess.

5 6. A combination according to any one of Claims 2 to 5, wherein said fixed surface is on the top of the block.

10 7. A combination according to Claim 2 or 3, wherein the bolt is screw-threaded at the top and the walls of said vertical hole are screw-threaded to suit, the block being screwed onto the top of the bolt.

15 8. A combination according to Claim 1, wherein two hooks made of bent metal bar have their shanks inserted and fixed in the sleeper and they form two arches under which said first portion of the fastening member is disposed.

20 9. A combination according to Claim 8, wherein the two hooks are integral with one another, their lower ends being joined by further bar material.

25 10. A combination according to Claim 8 or 9, wherein each hook passes through a hole in a plate upon which said fixed surface is provided.

30 11. A combination according to Claim 1, including a length of metal bar bent so that its two ends are brought together facing one another and further bent so that it has two parallel U-shaped parts, the corresponding upper ends of the two U's being connected together by two arches which are spaced apart in the direction of the length of the rail, and wherein said first portion

of the fastening member is disposed under these arches. 35

12. A combination according to Claim 11, wherein the metal bar mentioned in Claim 11 is held down by a horizontal metal plate laid across the bases of the U's and a bolt passing through a hole in the plate and into the sleeper. 40

13. A combination according to Claim 12, wherein the plate has an upwardly turned portion that lies alongside the edge of the rail flange. 45

14. A combination according to Claim 1, wherein the retaining arrangement consists of a single casting having a horizontal passage through it in which said first portion of the fastening member lies and also having at least one projection extending downwardly into at least one recess in the sleeper. 50

15. A railway rail and fastening arrangement substantially as hereinbefore described with reference to Figures 1 to 6, or Figures 7 and 8, or Figures 9 to 11, or Figures 12 to 15, or Figures 16 to 18 or Figures 19 and 20 of the accompanying drawings. 55 60

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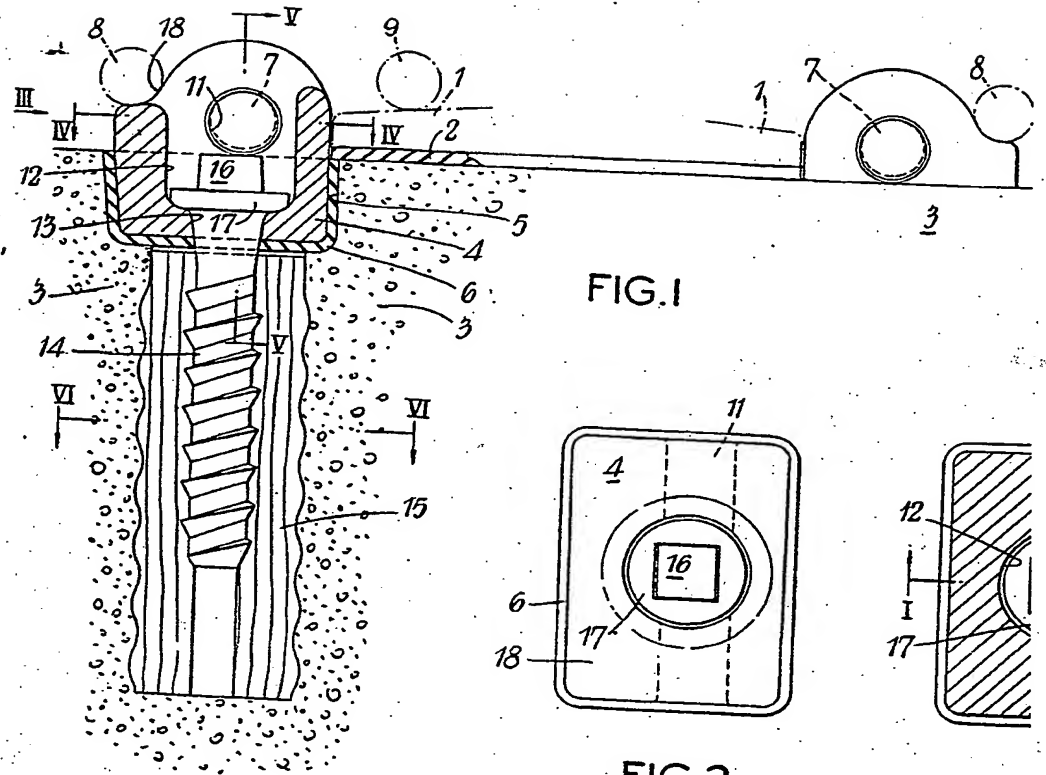


FIG. 1

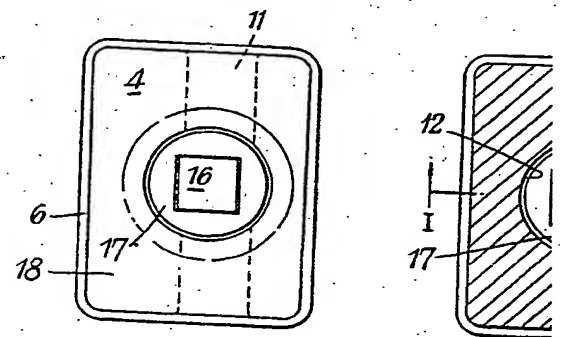


FIG. 2

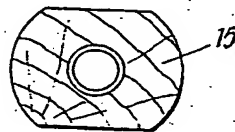


FIG. 6

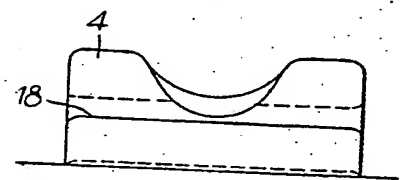


FIG. 3

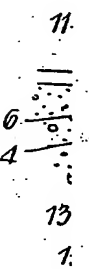


FIG. 5

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COMPLETE SPECIFICATION

4 SHEETS

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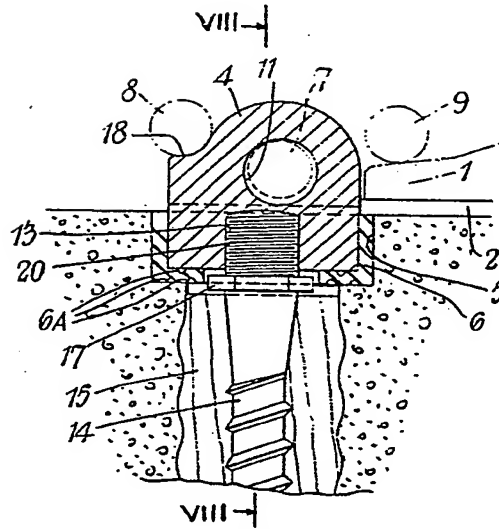
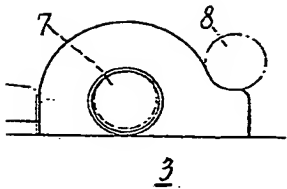


FIG.7

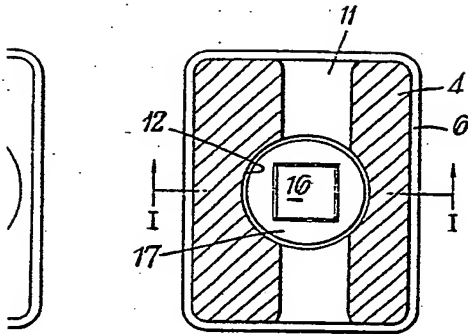


FIG.4

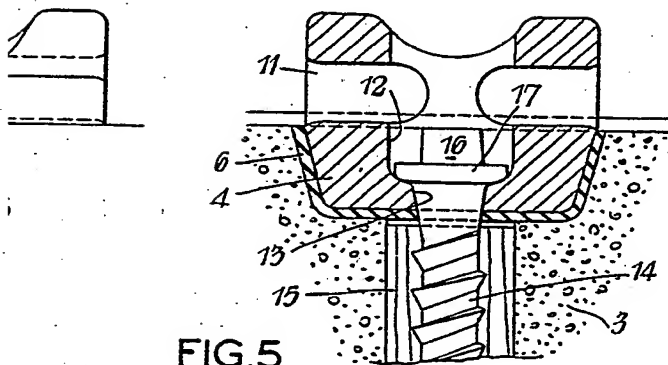


FIG.5

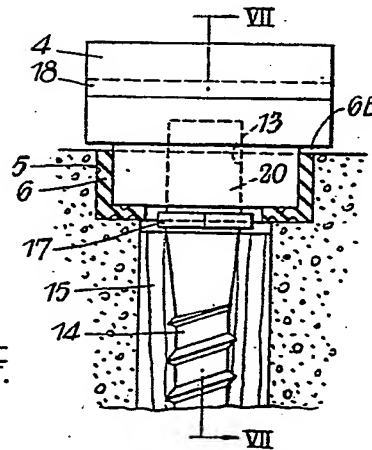


FIG.8

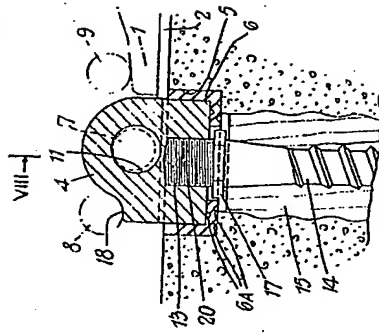


FIG. 1

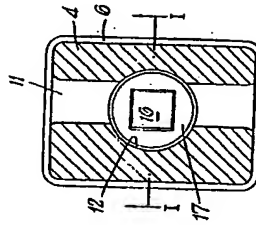


FIG. 2

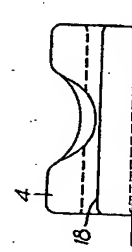


FIG. 3

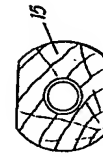


FIG. 4

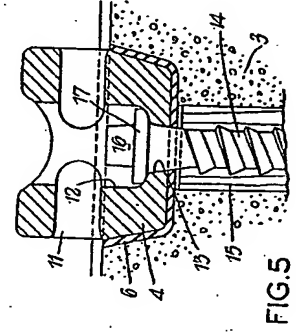


FIG. 5

FIG. 6

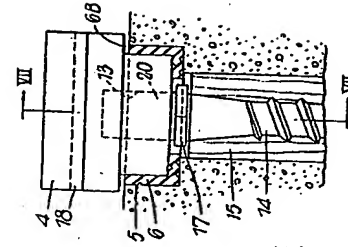


FIG. 7

FIG. 8

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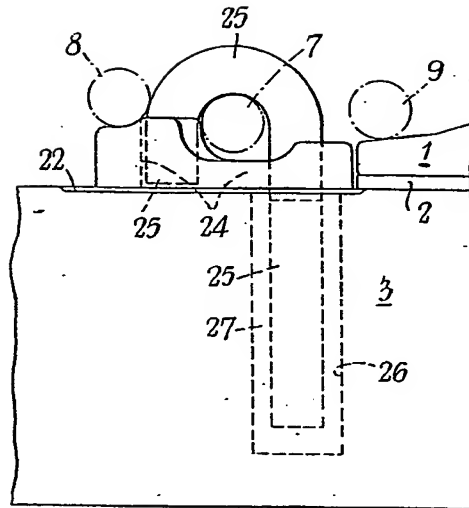


FIG. 9

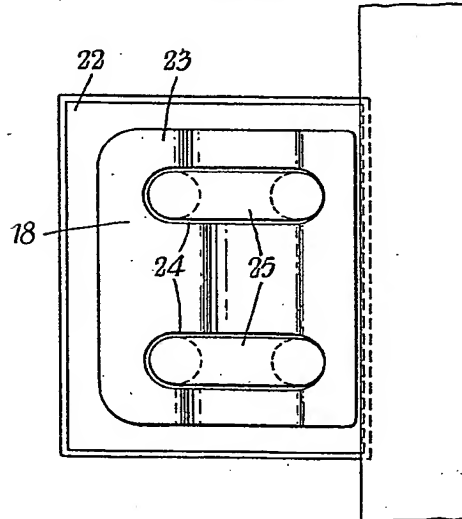


FIG. 10



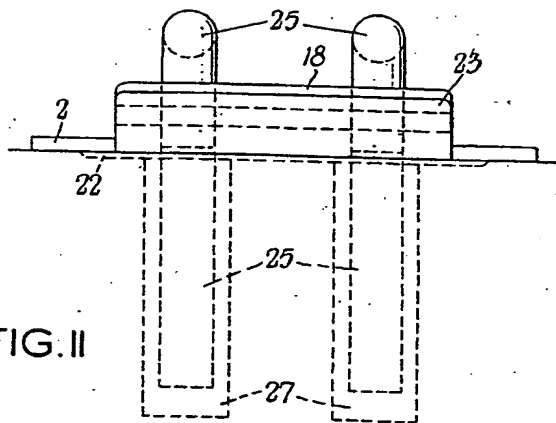


FIG. II

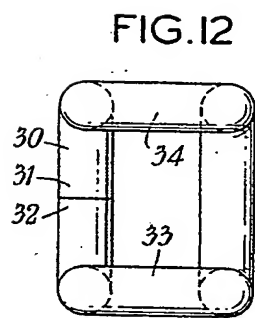


FIG. 12

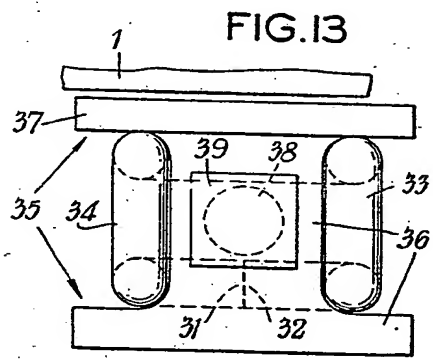


FIG. 13

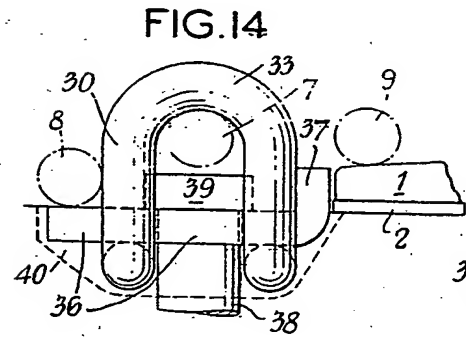


FIG. 14

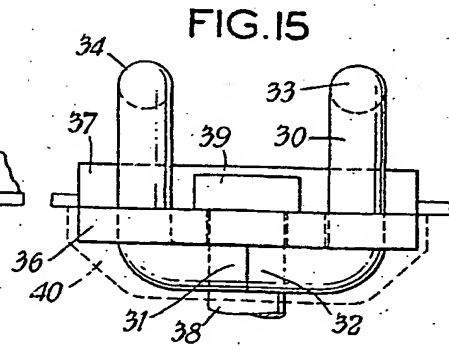


FIG. 15

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COMPLETE SPECIFICATION

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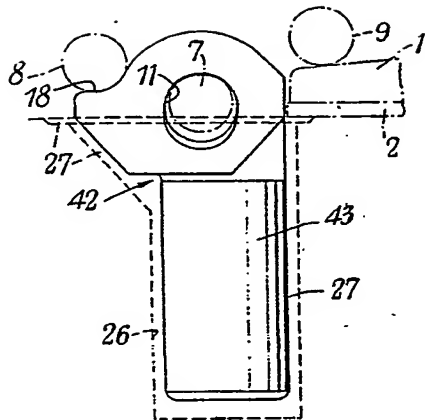


FIG. 16

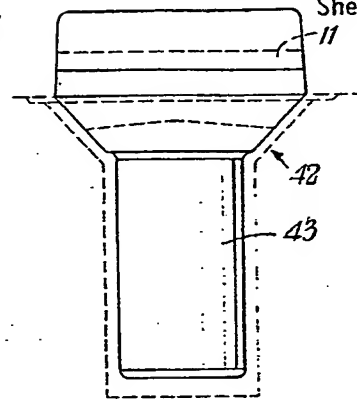


FIG. 17

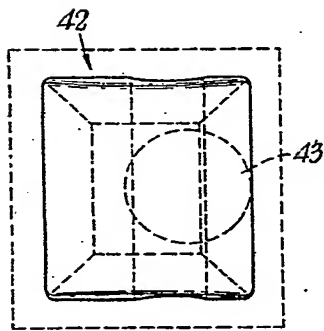


FIG. 18

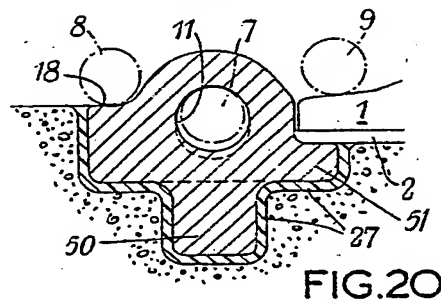


FIG. 20

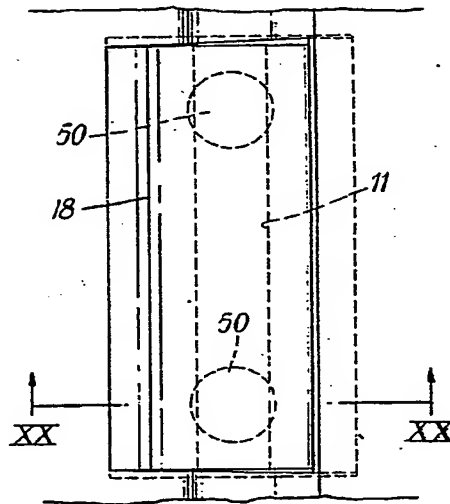
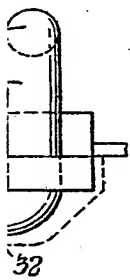
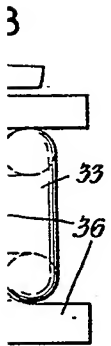


FIG. 19



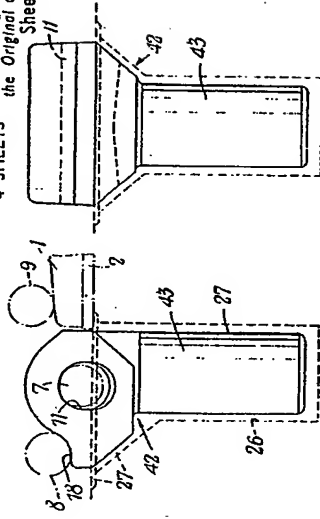


FIG. 16

FIG. 17

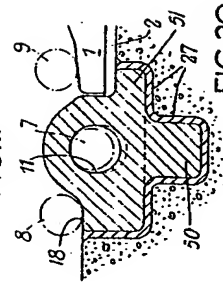


FIG. 20

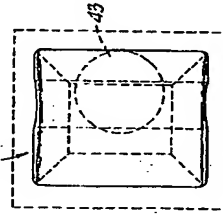


FIG. 18

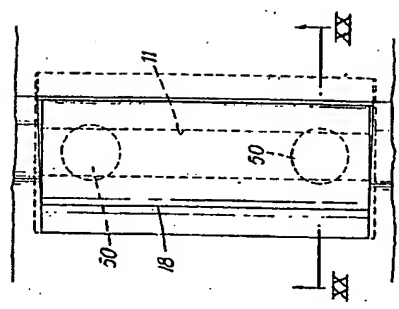


FIG. 19

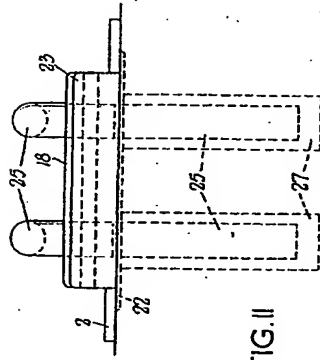


FIG. 11

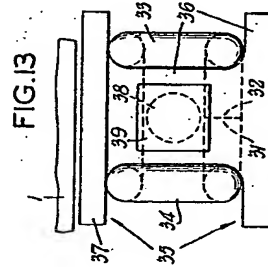


FIG. 13

FIG. 12

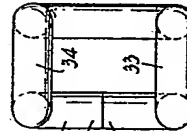
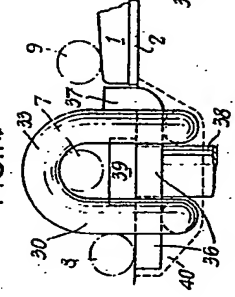
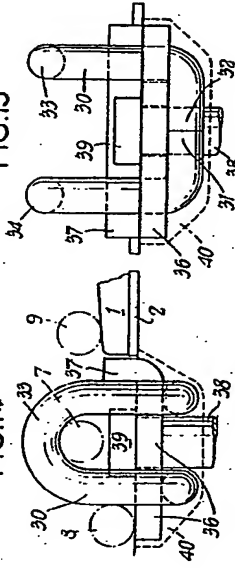


FIG. 15

FIG. 14



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